WHAT IS CLAIMED IS:

1. An apparatus for encoding and decoding a voice signal, the apparatus comprising:

an encoder configured to generate an output bitstream signal from an input voice signal, the output bitstream signal associated with at least a first standard of a first plurality of CELP voice compression standards;

a decoder configured to generate an output voice signal from an input bitstream signal, the input bitstream signal associated with at least a first standard of a second plurality of CELP voice compression standards;

wherein the CELP encoder comprises:

a plurality of codec-specific encoder modules, at least one of the plurality of codec-specific encoder modules including at least a first table, at least a first function or at least a first operation, the first table, the first function or the first operation associated with only a second standard of the first plurality of CELP voice compression standards;

a plurality of generic encoder modules, at least one of the plurality of generic encoder modules including at least a second table, a second function or a second operation, the second table, the second function or the second operation associated with at least a third standard and a fourth standard of the first plurality of CELP voice compression standards, the third standard and the fourth standard of the first plurality of CELP voice compression standards being different;

wherein the CELP decoder comprises:

a plurality of codec-specific decoder modules, at least one of the plurality of codec-specific decoder modules including at least a third table, at least a third function or at least a third operation, the third table, the third function or the third operation associated with only a second standard of the second plurality of CELP voice compression standards;

a plurality of generic decoder modules, at least one of the plurality of generic decoder modules including at least a fourth table, a fourth function or a fourth operation, the fourth table, the fourth function or the fourth operation associated with at least a third standard and a fourth standard of the second plurality of CELP voice compression standards, the third standard and the fourth standard of the second plurality of CELP voice compression standards being different.

2. The apparatus of claim 1 wherein the output bitstream signal is bit exact for the first standard of the first plurality of CELP voice compression standards.

3. The apparatus of claim 1 wherein the output bitstream signal is equivalent in quality for the first standard of the first plurality of CELP voice compression standards.

4. The apparatus of claim 1 wherein the plurality of generic encoder modules comprises:

a first common functions library, the first common functions library including at least the second function;

a first common math operations library, the first common math operations library including at least the second operation;

a first common tables library, the first common tables library including at least the second table.

5. The apparatus of claim 4, wherein the generic decoder modules comprise:

a second common functions library, the second common functions library including at least the fourth function;

a second common math operations library, the second common math operations library including at least the fourth operation;

a second common tables library, the second common tables library including at least the fourth table.

6. The apparatus of claim 5 wherein the first common functions library, the first common math operations library and the first common tables library are made by at least an algorithm factorization module, the algorithm factorization module configured to remove a first plurality of generic functions, a first plurality of generic operations and a first plurality of generic tables from the plurality of codec-specific encoder modules and store the first plurality of generic functions, the first plurality of generic operations and the first plurality of generic tables in the first common functions library, the first common math operations library and the first common tables library.

7. The apparatus of claim 6 wherein the first common functions library, the first common math operations library and the first common tables library are associated with at least the third standard and the fourth standard of the first plurality of CELP voice compression standards and configured to substantially remove all duplications between a first program code associated with the third standard of the first plurality of CELP voice compression standards and a second program code associated with the fourth standard of the first plurality of CELP voice compression standards.

8. The apparatus of claim 5 wherein the first common functions library, the first common math operations library and the first common tables library include only functions, math operations and tables configured to maintain bit exactness for the third standard and the fourth standard of the first plurality of CELP voice compression standards.

9. The apparatus of claim 4 wherein the first common functions library, the first common math operations library and the first common tables library include only functions, math operations and tables algorithmically identical to ones of the third standard and the fourth standard of the first plurality of CELP voice compression standards, and functions, math operations and tables algorithmically similar to ones of the third standard and the fourth standard of the first plurality of CELP voice compression standards.

10. The apparatus of claim 1 wherein the plurality of codec-specific encoder modules comprise:

a pre-processing module configured to process the speech for encoding;

a linear prediction analysis module configured to generate linear prediction parameters;

an excitation generation module configured to generate an excitation signal by filtering the input speech signal by the short-term prediction filter;

a long-term prediction module configured to generate open-loop pitch lag parameters;

an adaptive codebook module configured to determine an adaptive codebook lag and an adaptive codebook gain;

a fixed codebook module configured to determine fixed codebook vectors and a fixed codebook gain;

a bitstream packing module including at least one bitstream packing routine and configured to generate the output bitstream signal based on at least codec-specific CELP parameters associated with at least the first standard of the first plurality of CELP voice compression standards.

11. The apparatus of claim 1 wherein the plurality of codec-specific decoder modules comprise:

a bitstream unpacking module including at least one bitstream unpacking routine and configured to decode the input bitstream signal and generate codec-specific CELP parameters;

an excitation reconstruction module configured to reconstruct an excitation signal based on at least information associated with adaptive codebook lags, adaptive codebook gains, fixed codebook indices and fixed codebook gains;

a synthesis module configured to filter the excitation signal and generate a reconstructed speech;

a post-processing module configured to improve a perceptual quality of the reconstructed speech.

12. The apparatus of claim 1 wherein the first plurality of CELP voice compression standards are the same as the second plurality of CELP voice compression standards.

13. The apparatus of claim 1 wherein the first standard of the first plurality of CELP voice compression standards is the same as the first standard of the second plurality of CELP voice compression standards.

14. The apparatus of claim 1 wherein the first standard of the first plurality of CELP voice compression standards is the same as the second standard of the first plurality of CELP voice compression standards.

15. The apparatus of claim 1 wherein the first standard of the first plurality of CELP voice compression standards is the same as the third standard or the fourth standard of the first plurality of CELP voice compression standards.

16. The apparatus of claim 1 wherein the first standard of the second plurality of CELP voice compression standards is the same as the second standard of the second plurality of CELP voice compression standards.

17. The apparatus of claim 1 wherein the first standard of the second plurality of CELP voice compression standards is the same as the third standard or the fourth standard of the second plurality of CELP voice compression standards.

18. A method for encoding and decoding a voice signal, the method comprising:

receiving an input voice signal;

processing the input voice signal;

generating an output bitstream signal based on at least information associated with the input voice signal, the output bitstream signal associated with at least a first standard of a first plurality of CELP voice compression standards;

receiving an input bitstream signal;

processing the input bitstream signal;

generating an output voice signal based on at least information associated with the input bitstream signal, the output voice signal associated with at least a first standard of a second plurality of CELP voice compression standards;

wherein the processing the input voice signal uses at least a first common functions library, at least a first common math operations library, and at least a first common tables library, the first common functions library including a first function; the first common math operations library including a first operation, the first common tables library including a first table;

wherein the first function, the first operation and the first table are associated with at least a second standard and a third standard of the first plurality of CELP voice compression standards, the second standard and the third standard of the first plurality of CELP voice compression standards being different;

wherein the generating an output bitstream signal comprises:

generating a first plurality of codec-specific CELP parameters based on at least information associated with the input voice signal;

packing the first plurality of codec-specific CELP parameters to the output bitstream signal;

wherein the processing the input bitstream signal uses at least a second common functions library, at least a second common math operations library, and a second common tables library, the second common functions library including a second function, the second common math operations library including a second operation, the second common tables library including a second table;

wherein the second function, the second operation and the second table are associated with at least a second standard and a third standard of the second plurality of CELP voice compression standards, the second standard and the third standard of the second plurality of CELP voice compression standards being different;

wherein the generating an output voice signal comprises:

unpacking the input bitstream signal;

decoding a second plurality of codec-specific CELP parameters to produce an output voice signal.

19. The method of claim 18 wherein the first common functions library, the first common math operations library and the first common tables library are made by at least an algorithm factorization module, the algorithm factorization module configured to store a first plurality of generic functions, a first plurality of operations and a first plurality of tables in the first common functions library, the first common math operations library and the first common tables library.

20. The method of claim 18 wherein the output bitstream signal is bit exact for the first standard of the first plurality of CELP voice compression standards.

21. The method of 18 wherein the output bitstream signal is equivalent in quality for the first standard of the first plurality of CELP voice compression standards.

22. The method of claim 18 wherein the output voice signal is bit exact for the first standard of the second plurality of CELP voice compression standards.

23. The method of 18 wherein the output voice signal is equivalent in quality for the first standard of the second plurality of CELP voice compression standards.

24. The method of claim 18 wherein the first plurality of codec-specific CELP parameters comprise a linear prediction parameter, an adaptive codebook lag, an adaptive codebook gain, a fixed codebook index, and a fixed codebook gain.

25. The method of claim 24 wherein the linear prediction parameter comprises a line spectral frequency.

26. The method of claim 18 wherein the generating a first plurality of code-specific CELP parameters comprises:

performing a linear prediction analysis;

generating linear prediction parameters;

filtering the input speech signal by a short-term prediction filter;

generating an excitation signal;

determining an adaptive codebook pitch lag parameter;

determining an adaptive codebook gain parameter;

determining an index of a fixed codebook vector associated with a fixed codebook target signal;

determining a gain of the fixed codebook vector.

27. The method of claim 18 wherein the decoding a second plurality of codec-specific CELP parameters comprises:

reconstructing an excitation signal;

synthesizing the excitation signal;

generating an intermediate speech signal;

processing the intermediate speech signal to improve a perceptual quality.

28. The method of claim 18, wherein the first plurality of CELP voice compression standards comprises GSM-EFR, GSM-AMR Narrowband, and GSM-AMR Wideband.

29. The method of claim 18, wherein the first plurality of CELP voice compression standards comprises EVRC and SMV.

30. The method of claim 18 wherein the first plurality of CELP voice compression standards are the same as the second plurality of CELP voice compression standards.

31. The method of claim 18 wherein the first standard of the first plurality of CELP voice compression standards is the same as the first standard of the second plurality of CELP voice compression standards.

32. The method of claim 18 wherein the first standard of the first plurality of CELP voice compression standards is the same as the second standard or the third standard of the first plurality of CELP voice compression standards.

33. The method of claim 18 wherein the first standard of the second plurality of CELP voice compression standards is the same as the second standard or the third standard of the second plurality of CELP voice compression standards.